



2007 SOUTH DAKOTA OIL & GAS UPDATE

BY

GERALD (MACK) MCGILLIVRAY

SIXTEENH WILLISTON BASIN

PETROLEUM CONFERENCE

APRIL 27 – 29, 2008



Saskatchewan

Manitoba

WILLISTON
BASIN

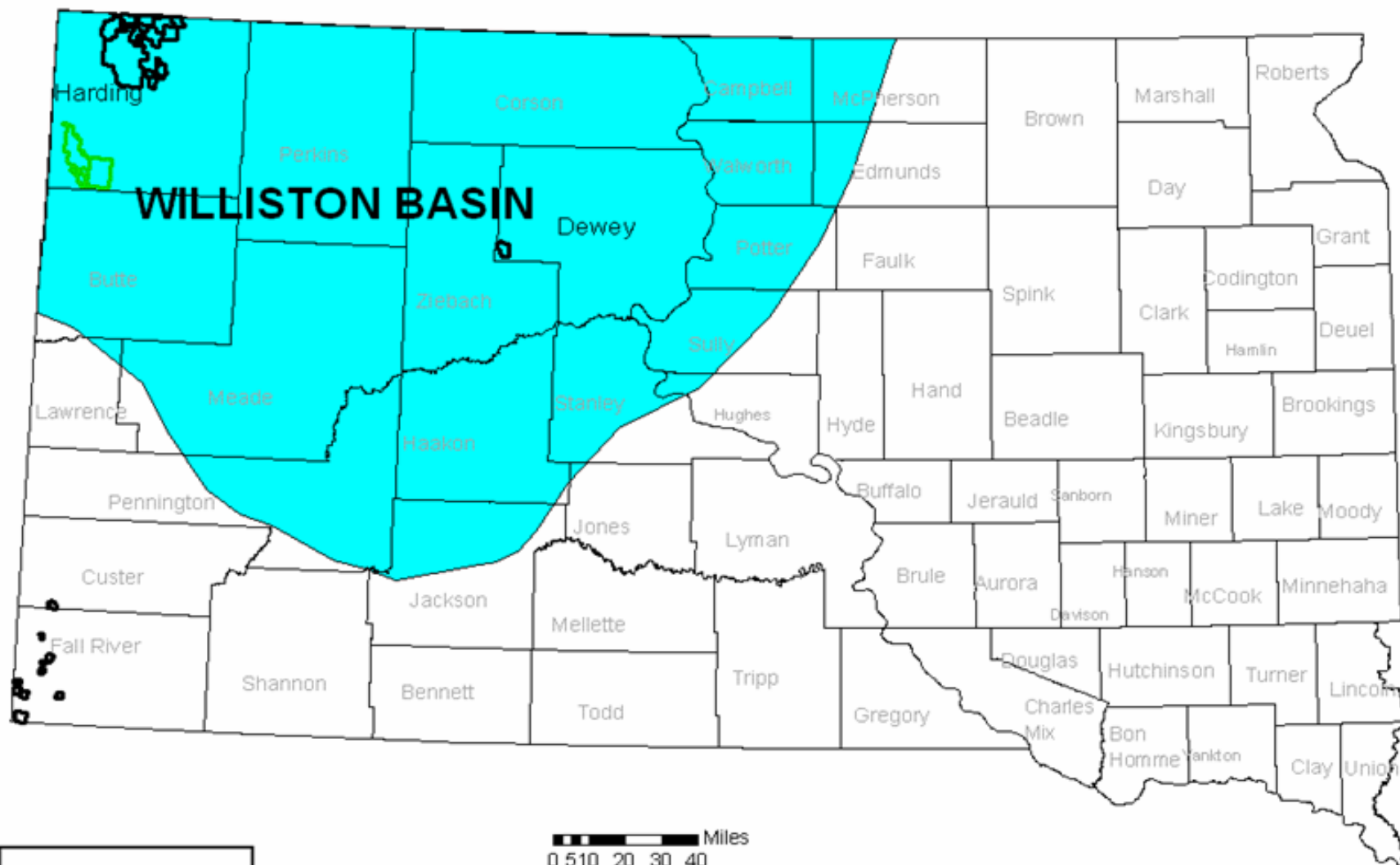
Montana

North Dakota

South Dakota

M

EXTENT OF WILLISTON BASIN IN SOUTH DAKOTA



LEGEND

-  OIL FIELDS
-  GAS FIELDS
-  WILLISTON BASIN

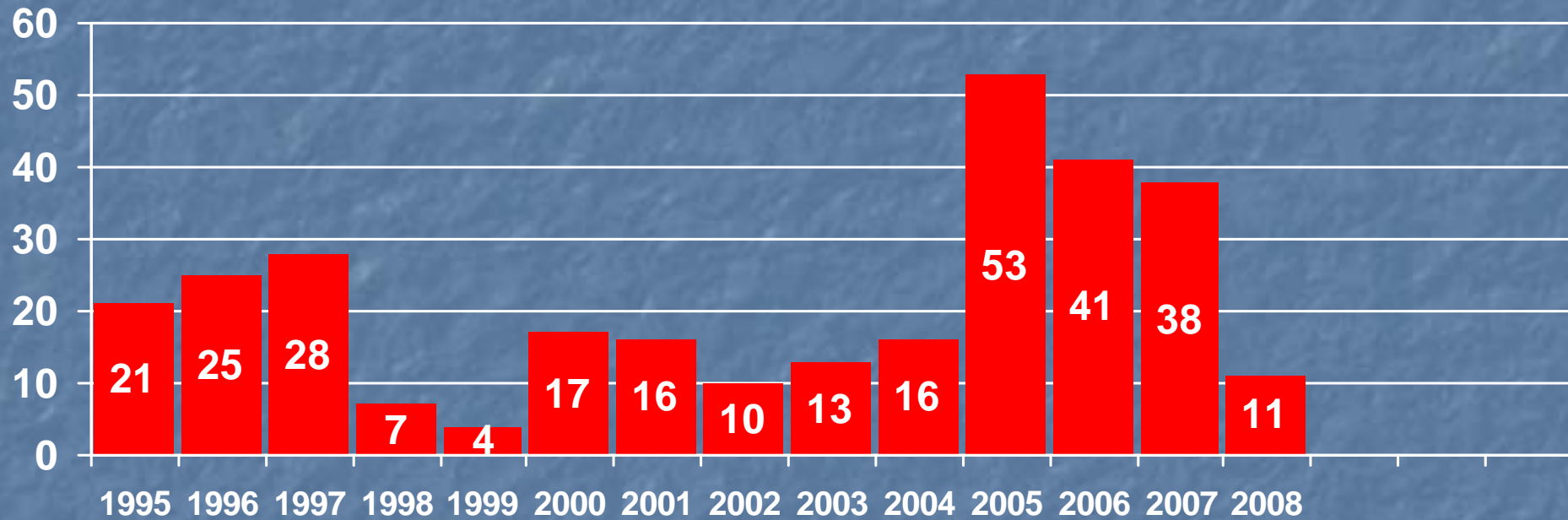
0 5 10 20 30 40 Miles



South Dakota
Department of Environment
& Natural Resources
Minerals and Mining Program
Oil & Gas Section - Rapid City, SD

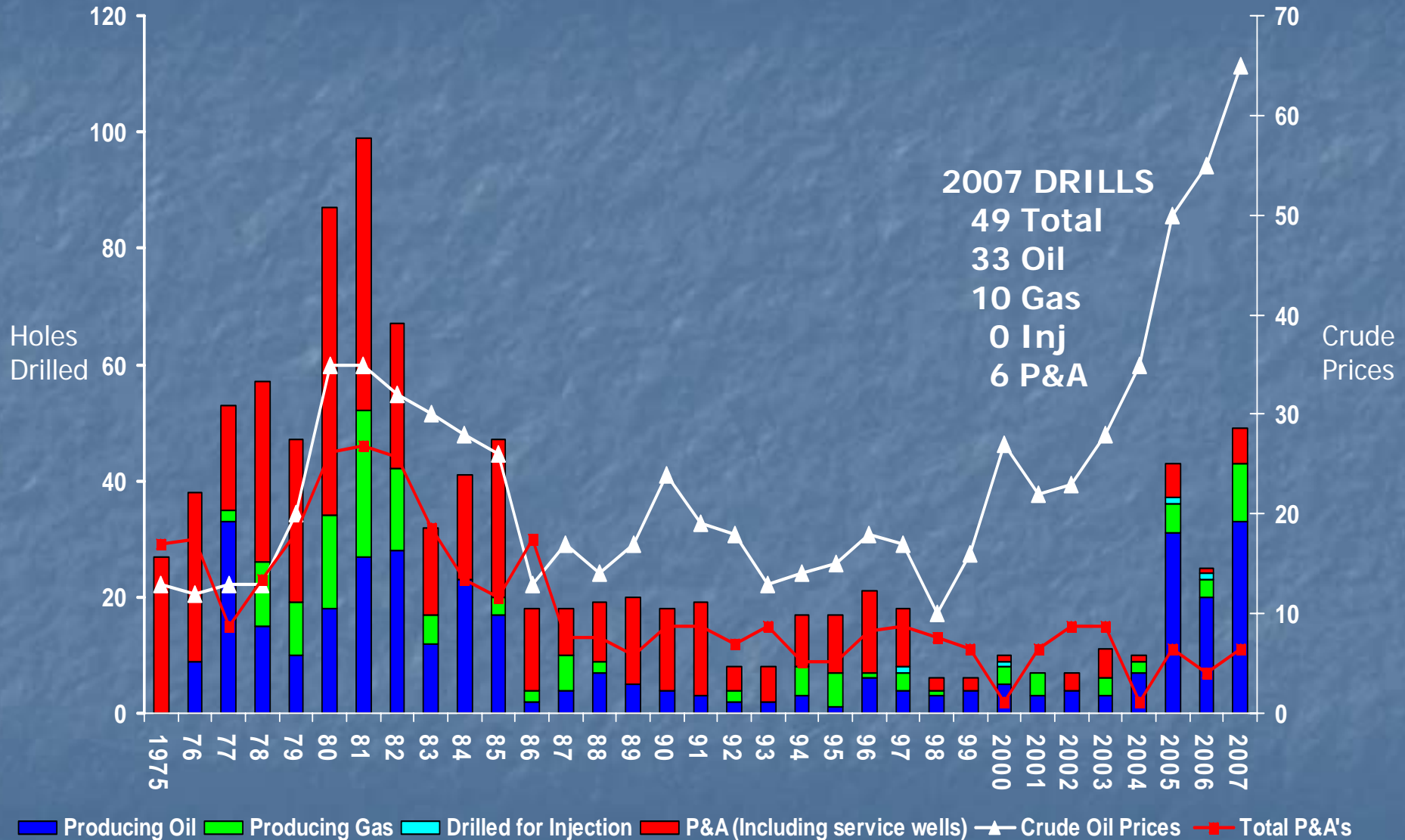
BY FRED STEECE AND MACK MCGILLIVRAY

South Dakota Drilling Permits Issued 1995 – 4/20/2008

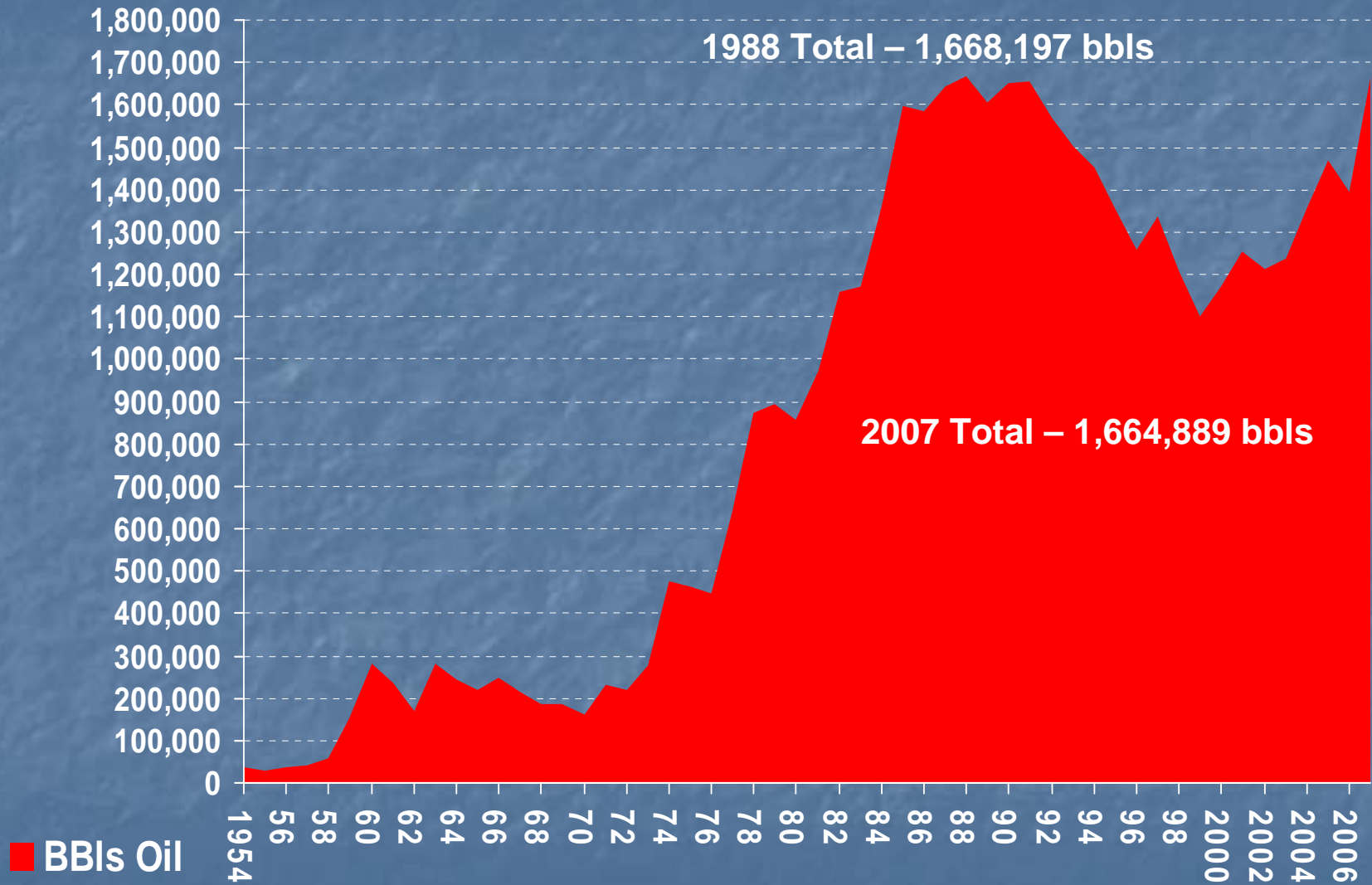


■ Number of Permits Issued

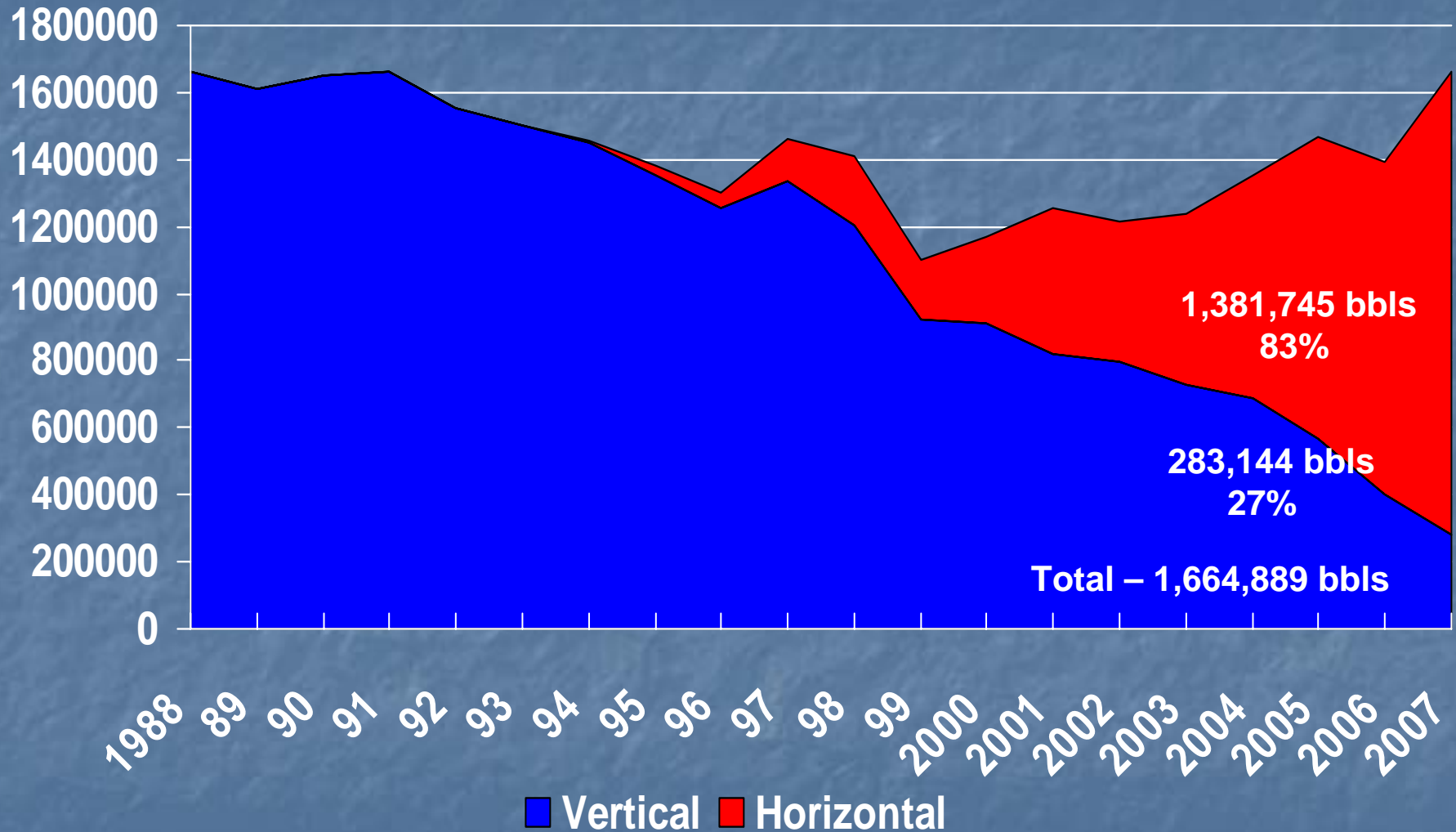
South Dakota Oil & Gas Tests/Plugs 1975-2007



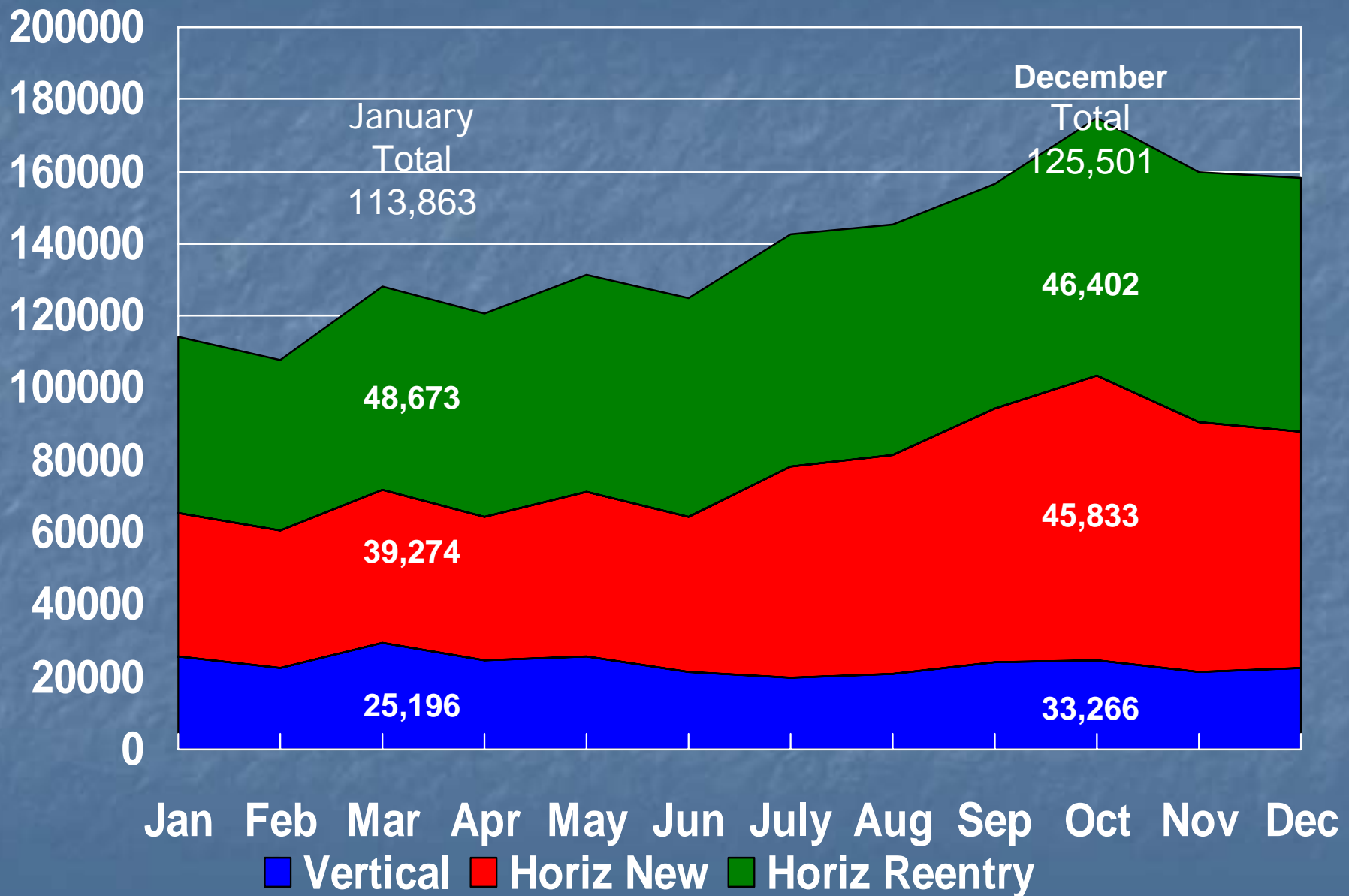
South Dakota Crude Oil Production (bbls) 1954-2007



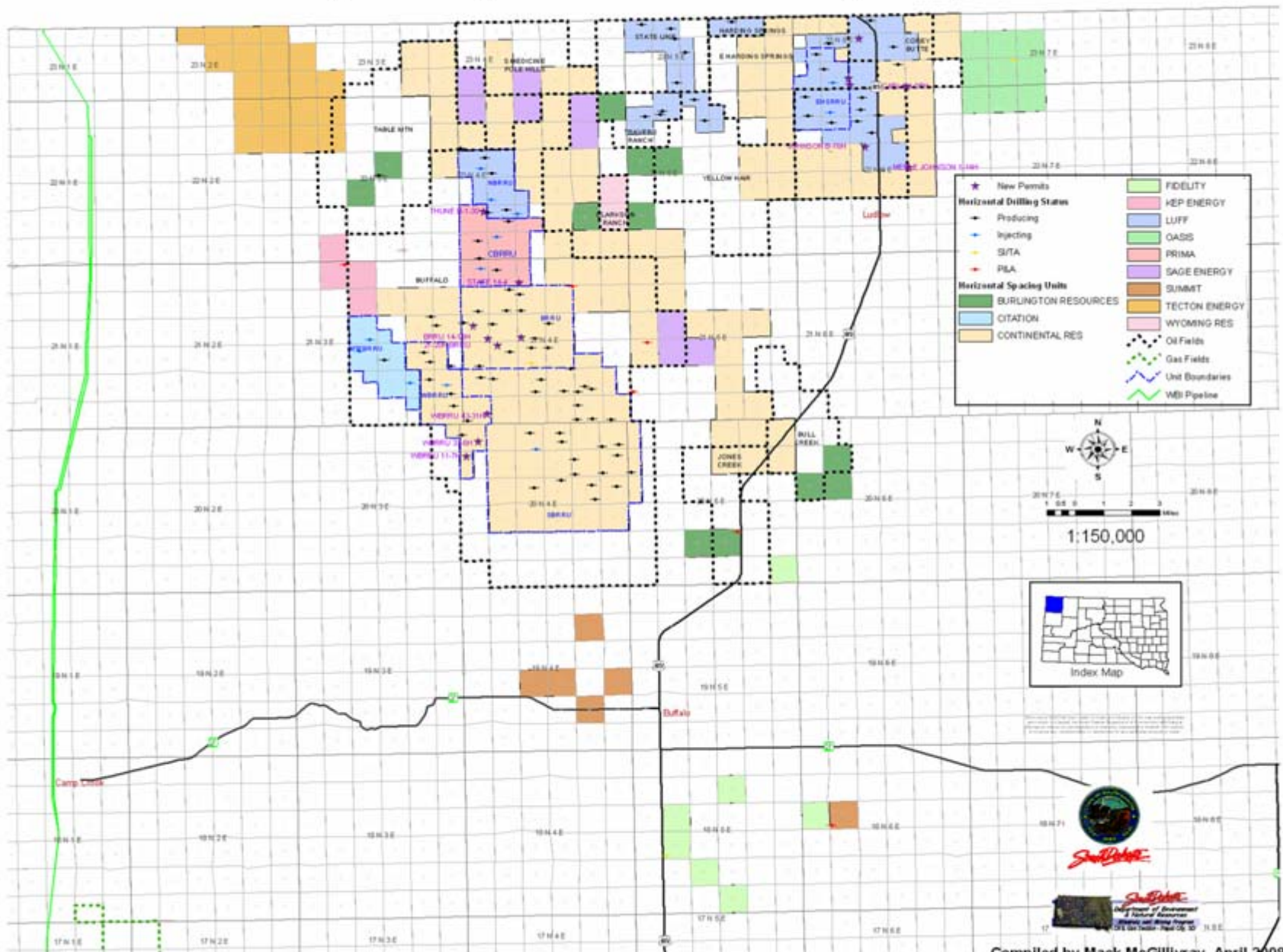
South Dakota 1988-2007 Yearly Oil Production (BBLs)



South Dakota 2007 Monthly Oil Production (BBLs)

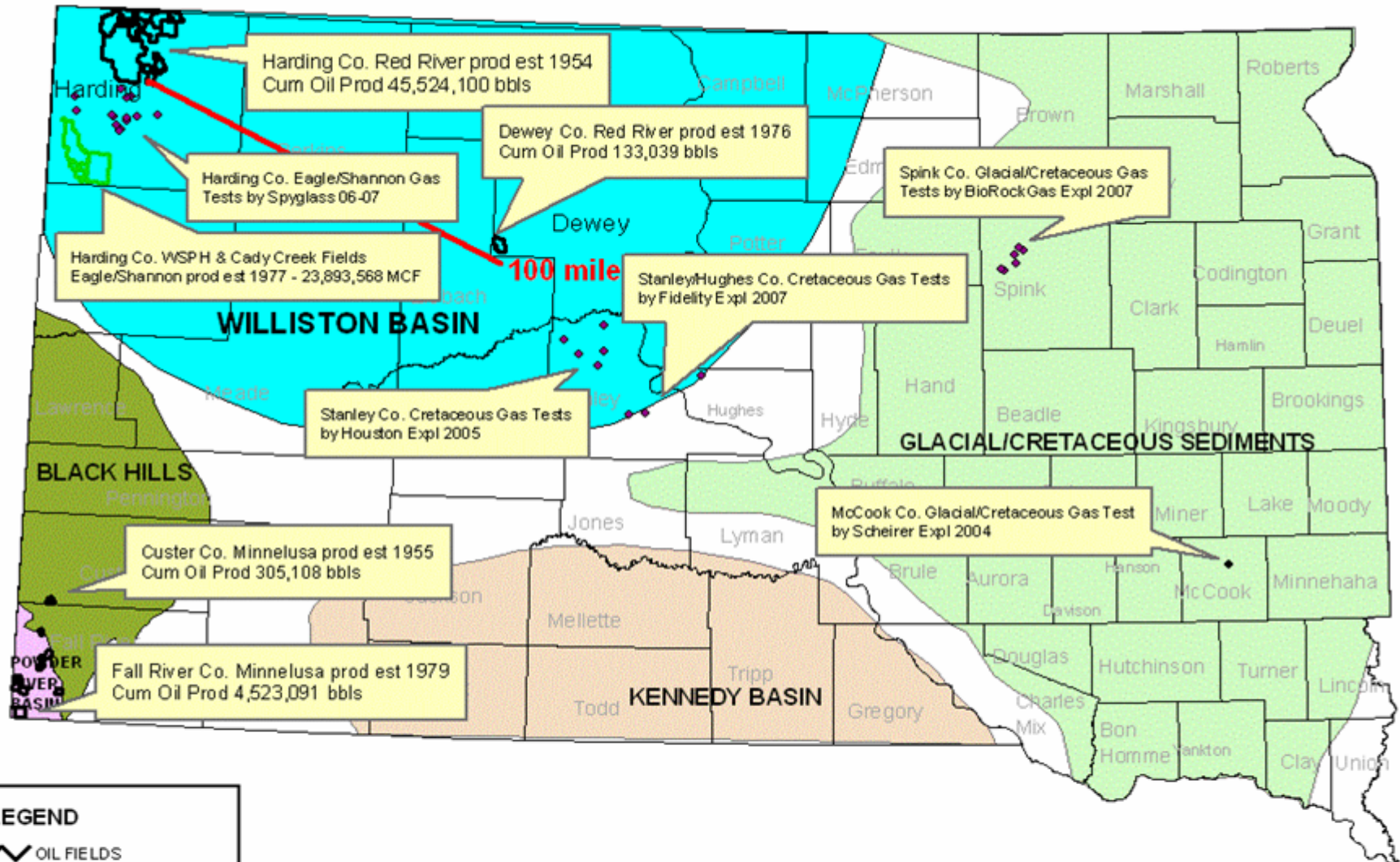


Harding County Horizontal Wells/Spacing Units



Compiled by Mack McGillivray, April 2008

CURRENT AND POTENTIAL OIL & GAS PRODUCING BASINS/AREAS IN SOUTH DAKOTA

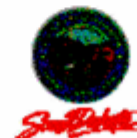


LEGEND

- OIL FIELDS
- GAS FIELDS
- WILLISTON BASIN
- POWDER RIVER BASIN
- BLACK HILLS
- KENNEDY BASIN
- GLACIAL/CRETACEOUS
- GAS WELL TESTS



0 10 20 30 40 Miles
Scale 1:2,500,000



South Dakota
Department of Environment
& Natural Resources
Minerals and Mining Program
Oil & Gas Section - Rapid City, SD
BY FRED STEECE AND MACK MCGILLIVRAY

***CURRENT
PUBLICATIONS
AND
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CHICAGO, ILL. 60607
TEL: 773-936-5000
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**GEOLOGIC MAP OF
SOUTH DAKOTA**

J. E. Martin, J. F. Torgay, N. S. Polunskaya,
D. M. Sankaran, L. D. Satchell

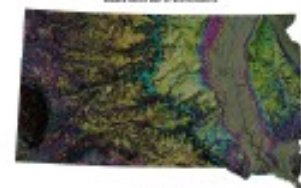
附註：本報記者採訪時，該公司負責人表示，目前該公司正與有關方面商討，爭取早日開工。

The authors acknowledge the financial support of the National Science Foundation (NSF) and the National Endowment for the Humanities (NEH). The authors also acknowledge the support of the National Science Foundation (NSF) and the National Endowment for the Humanities (NEH).

— George Bernard Shaw

1. Name	2. Address
3. City	4. State
5. Zip	6. Phone
7. E-mail	8. Fax
9. Business	10. Home
11. Mobile	12. Pager
13. Telex	14. Cable
15. Internet	16. Other
17. Signature	18. Stamp
19. Date	20. Time
21. Subject	22. Remarks
23. Initials	24. Full Name
25. Title	26. Position
27. Department	28. Division
29. Branch	30. Office
31. Location	32. Building
33. Floor	34. Room
35. Suite	36. Box
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39. City	40. State
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43. E-mail	44. Fax
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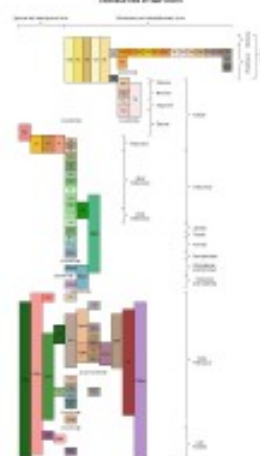
TABLE 10.10.10.2. *Continued*



1999



© 2000 Blackwell Science Ltd *Journal of Internal Medicine* 247: 395–401



© 2004 Blackwell Publishing Ltd *Journal of Internal Medicine* 255: 105–112

[illegible]



**Bedrock Geologic Map Showing
Configuration of the Bedrock
Surface in South Dakota
East of the Missouri River**

2004

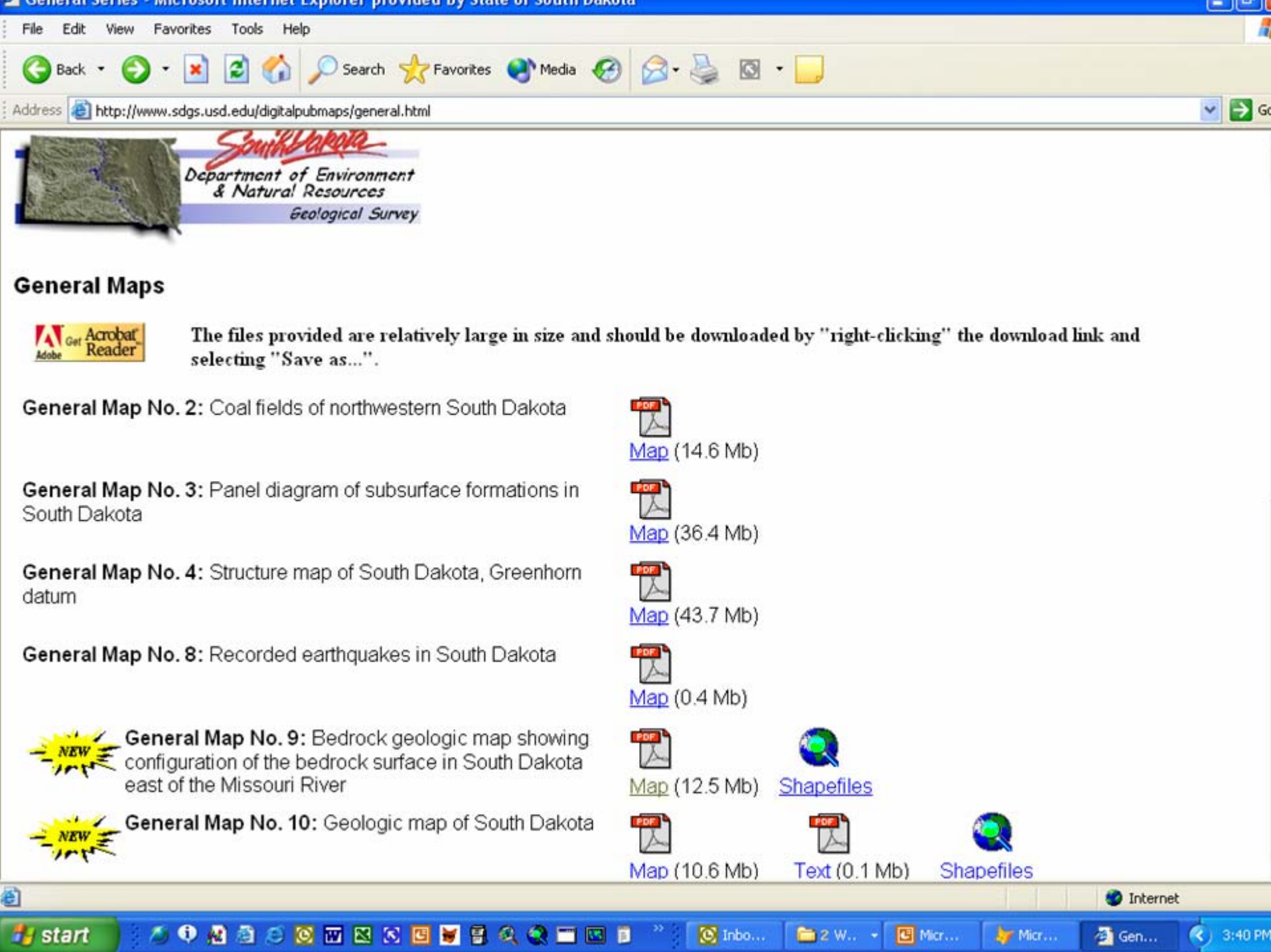
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[illegible][illegible]

Source of data used in computing the time through the following: (1) discharge logs at both dams and wells on file with the Tennessee Valley Authority; (2) reports, Department of Environment and Public Health; (3) reports and unpublished drawings, report of the International Marine Program, Department of Environment and Public Health; and (4) U.S. Geological Survey, 1960, North-South transect map.

[illegible]



General Maps



The files provided are relatively large in size and should be downloaded by "right-clicking" the download link and selecting "Save as..."

General Map No. 2: Coal fields of northwestern South Dakota


[Map](#) (14.6 Mb)

General Map No. 3: Panel diagram of subsurface formations in South Dakota


[Map](#) (36.4 Mb)

General Map No. 4: Structure map of South Dakota, Greenhorn datum


[Map](#) (43.7 Mb)

General Map No. 8: Recorded earthquakes in South Dakota


[Map](#) (0.4 Mb)



General Map No. 9: Bedrock geologic map showing configuration of the bedrock surface in South Dakota east of the Missouri River


[Map](#) (12.5 Mb) [Shapefiles](#)



General Map No. 10: Geologic map of South Dakota


[Map](#) (10.6 Mb)  [Text](#) (0.1 Mb)  [Shapefiles](#)

O&G Dev

RULES & REGS

NEW PERMITS

FORMS

PROD/INJ

MAPS

WELL DATA

LINKS



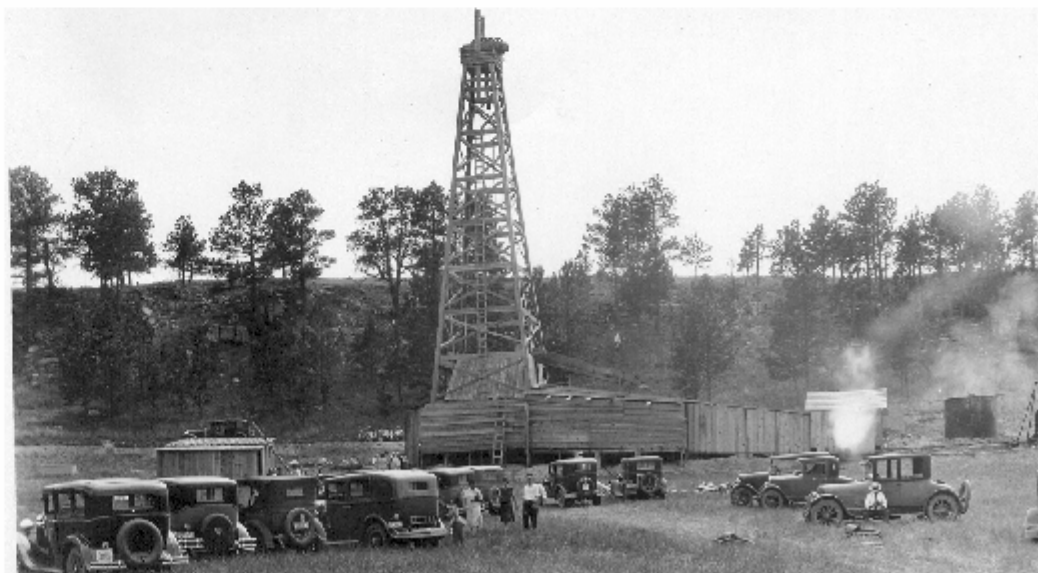
Fred Steece - Oil & Gas Supervisor/Geology Specialist ([E-mail](#))

Gerald (Mack) McGillivray - Senior Geologist/Web Page Developer ([E-mail](#))

Welcome to the South Dakota Oil & Gas Section homepage. The Oil & Gas Section is under the [Minerals & Mining Program](#), [Division of Environmental Services](#), [Department of Environment and Natural Resources](#), and is located at 2050 W. Main, Suite #1, Rapid City, SD 57701. PH: (605) 394-2229.

What We Do

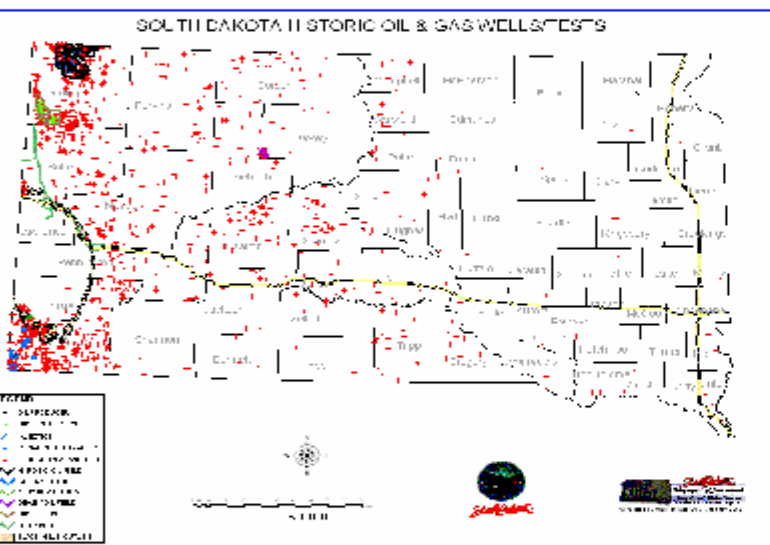
The purpose of the Oil & Gas Section is to provide environmental regulation in a customer service oriented manner, and to promote the development of oil and gas resources in the state in a manner that will prevent waste, encourage the greatest economic recovery of oil and gas, and protect correlative rights, ground water resources, the environment and human health.



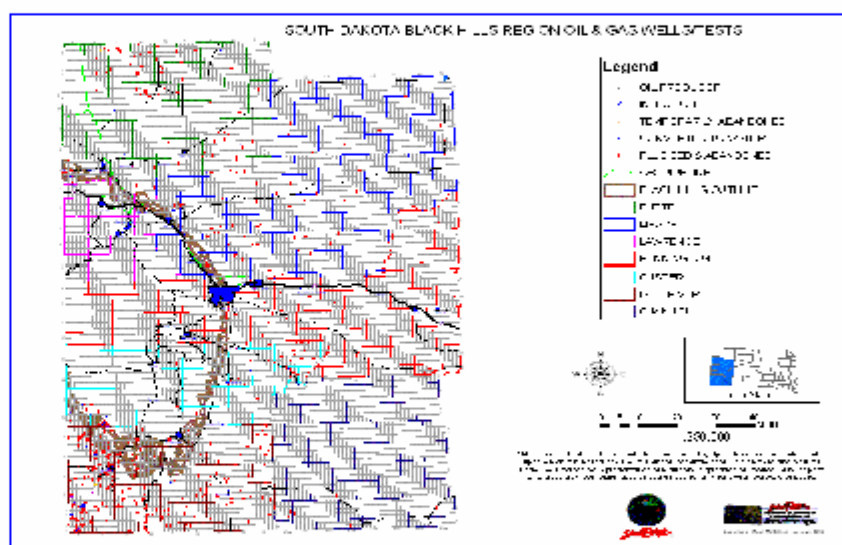
Our maps are updated on a monthly, or as needed, basis. They are also available by mail order (including key with well locations and data) from our office. The prices and costs are listed below. Costs for larger scale plots will be determined on a case-by-case basis.

8 1/2x11 in. \$1.00 - 11x17 in. \$1.25 - 17x22 in. \$2.50 - 22x34 in. \$5.00 - 34x44 in. \$10.00

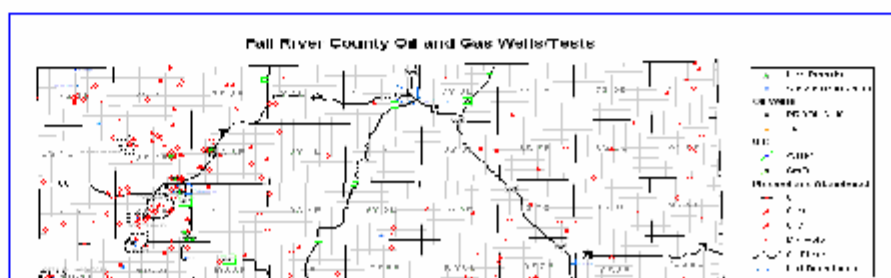
To order, please contact Mack McGillivray at mack.mcgilivray@state.sd.us or call 605-394-2229.



South Dakota Statewide



Black Hills Region





ENTER SEARCH CRITERIA

Search Tips

Search Field

Value

Well Field 

equals

Buffalo

- ☐ Simple
- ☒ AND
- ☐ OR

Location 

equals

%22N-4E%

Search

Reset

[Help on Fields](#)

[About](#)

Oil and Gas Search for: *well_field like 'Buffalo' AND loc like '%22N-4E%'*

Page 1 of 2

Print Preview

Export Results

☒ well

☐ formation

☐ both

Page: Prev

1

Next

Record 1 of 20

Well Information

API No:	40 063 20056	County:	HARDING
Well Name:	PHILLIPS 1 B THOMAS	Location:	NWSW 32-22N-4E
Permit No:	659	Total Depth:	8790
Operator Name:	PHILLIPS PETROLEUM CO	Bottom Hole:	Red River
Permit Date:	1972-05-02	KB Elevation:	3046
Spud Date:	1972-06-03	Ground Elevation:	3034
Plug Date:	1982-08-18	Latitude:	45.825545
		Longitude:	-103.661939
Well Field	BUFFALO	Status	P&A
Class:	OIL	Type:	

Formation Tops

<u>Formation</u>	<u>Depth (ft.)</u>
Piper	5316
Pine Salt	5602
Minnekahta	5944
Opeche	5990
Minnelusa	6099
1st Leo	6256

NEW STUFF!!

REVISED RULES

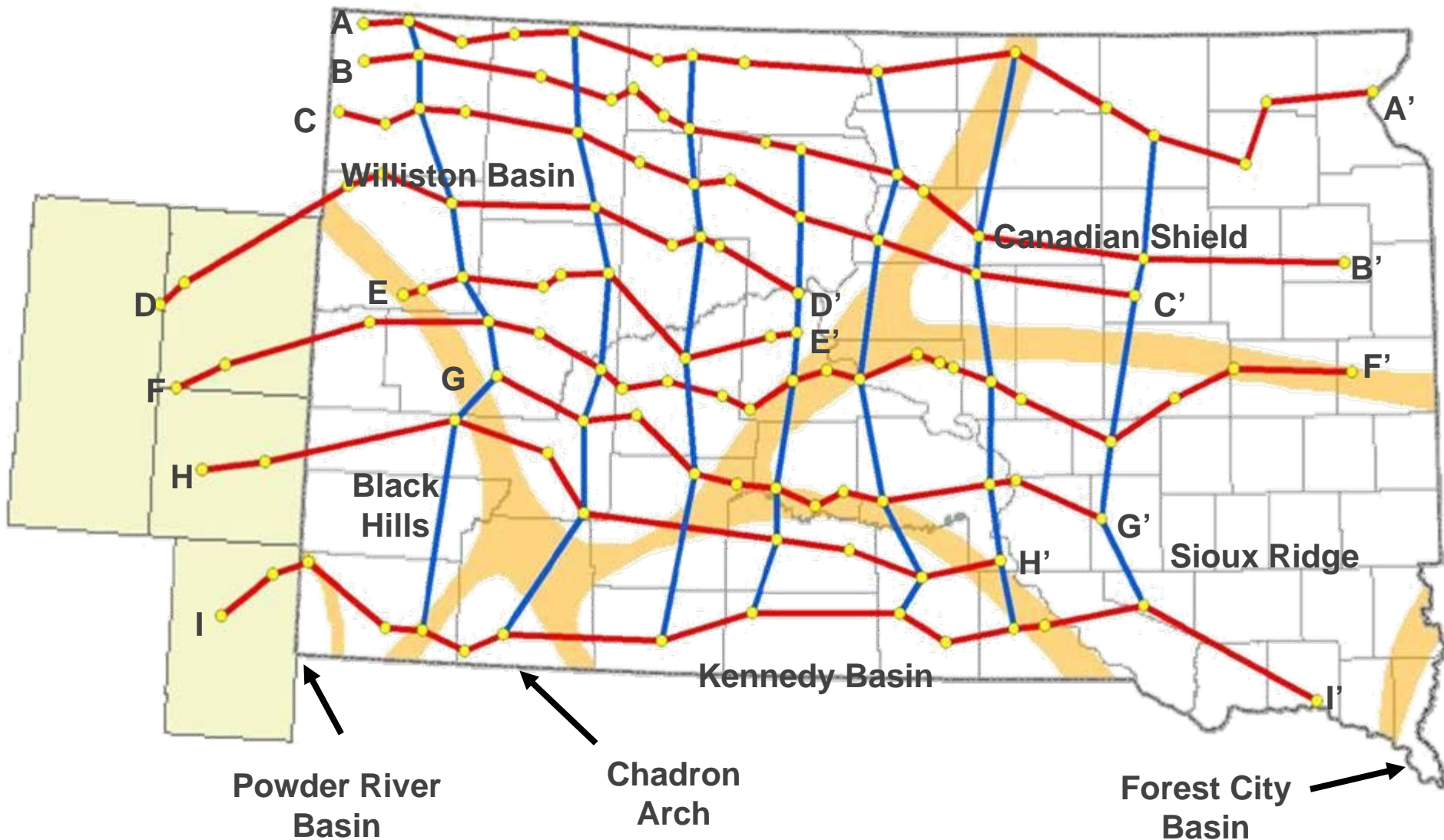
Revise 74:10:03:16. Procedures for setting surface casing and production casing.

The rule currently requires a minimum of 100 feet of surface casing to protect shallow aquifers in all oil and gas wells. Operators that are exploring for shallow oil and gas in the state asked the department to change the current rule because some of the oil and gas they are targeting is at depths of less than 100 feet. In addition, there are areas in the state where 100 feet of surface casing is not necessary due to the surface geology (shale, glacial till). This rule change will eliminate the minimum 100 feet of surface casing requirement and allow the department to determine how much surface casing is required on a case-by-case basis as we do now when more than 100 feet is required.

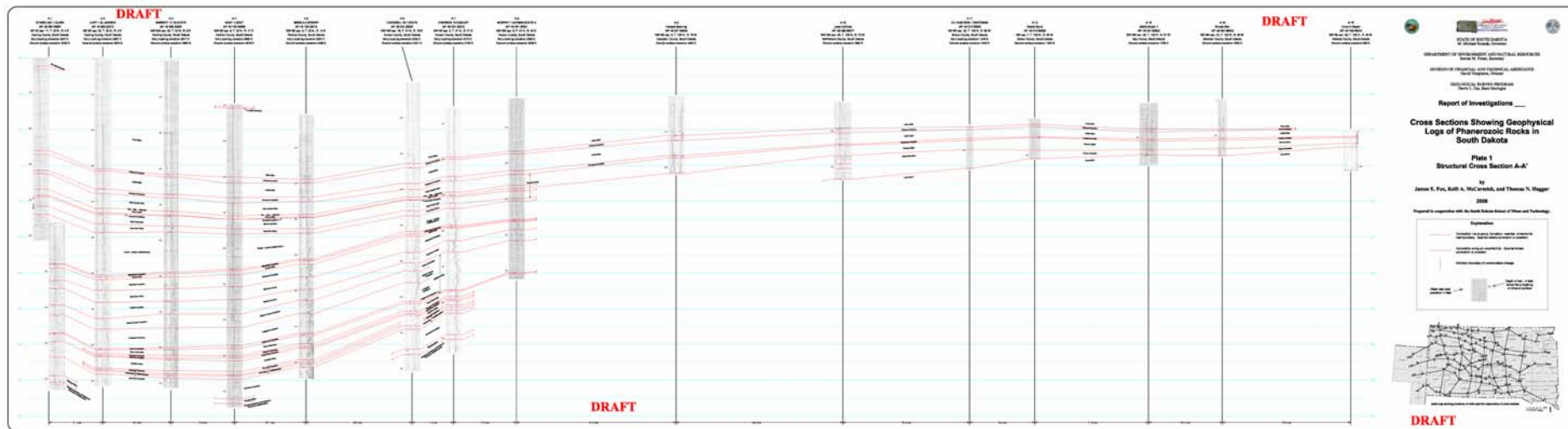
Revise 74:10:09:12. Secretary to set maximum injection pressure.

As the rule was written, the maximum injection pressure could not cause new fractures in the formation into which the fluid is injected. The DENR changed the rule so the maximum injection pressure does not cause new fractures in the confining zone. We believe this change is protective of potential underground sources of drinking water, and it is consistent with the surrounding states' Class II requirements and EPA guidance.

Cross Sections of Geophysical Logs of Phanerozoic Rocks in South Dakota

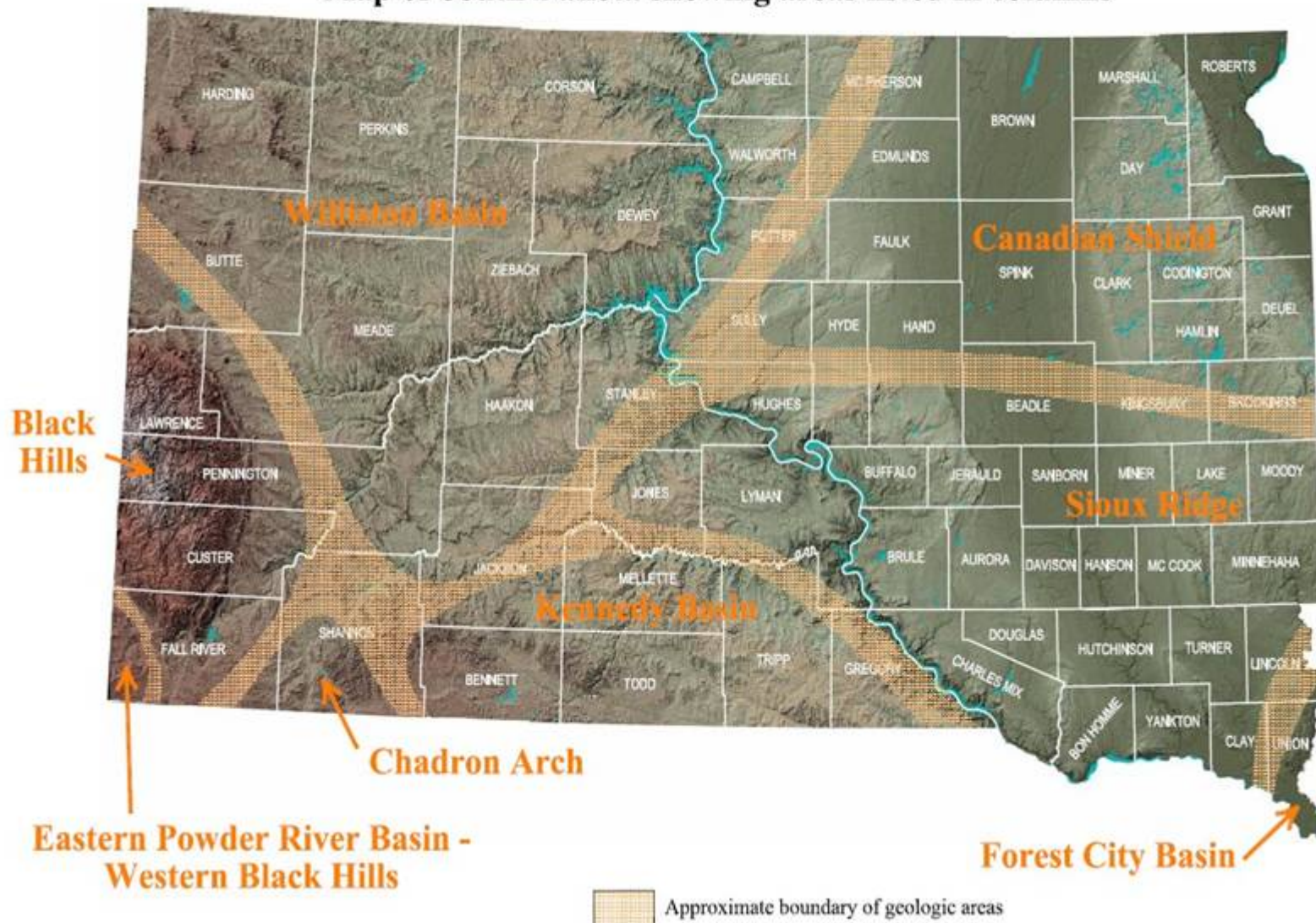


**Cross Section Showing Geophysical Logs of Phanerozoic Rocks
In the Northern Portion of the Williston Basin in South Dakota
By J.E. Fox (SDSMT) and K.A. McCormick and T.N. Hagggar (SDGS)**



Currently under Construction and will be available as a SDGS publication July, 2008

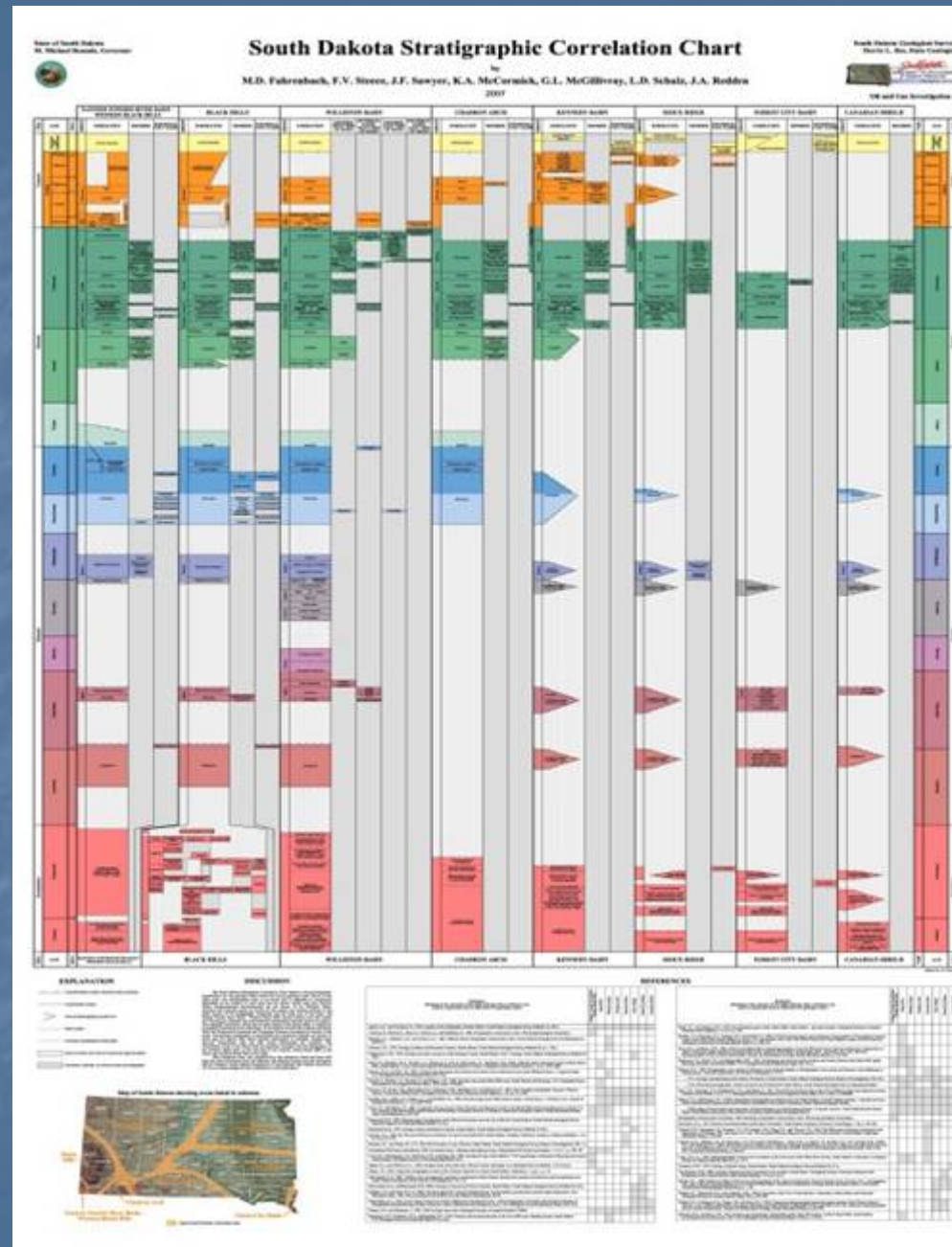
Map of South Dakota showing areas listed in columns



Stratigraphic Correlation Chart of South Dakota

Joint effort by DENR
Oil & Gas Section
And
South Dakota Geological Survey

Became available
as a SDGS publication
(Oil & Gas Investigation 1)
July, 2007





80 %

BW Mode

Dresser Atlas

Gamma Ray Neutron

NO. 659

COMPANY PHILLIPS PETROLEUM COMPANY

WELL THOMAS "B" NO. 1

FIELD BUFFALO

COUNTY HARDING STATE SOUTH DAKOTA

LOCATION:

850' FML - 1900' FSL 12
SEC 32 TWP 22N RGE 4E

Other Services

ACBL-SIGNATURE

Element Datum

BH FLANGE

Elev. 3034

Measured from KB

KB

12 Ft. Above Permanent Datum

Elevations:
KB 3045
DF 3045
GL 3034

No.

7-11-72

Log

ONE

th-Driller

8790

South Dakota Geological Survey

Log Logger

8748

Western Field Office

Logged Interval

SURFACE

308 West Blvd.

Fluid in Hole

WATER

Rapid City S. Dak. 57703

Density Ppm Cl.

FRESH

Density Lb./Gal.

824

Rec. Temp. Deg. F

4 HOURS

Rig Time

BAKER

Recorded By

MR. MITCHELL

Bore Hole Record

Casing Record

Bit

From

To

Size

Wgt.

From

To

8778

e

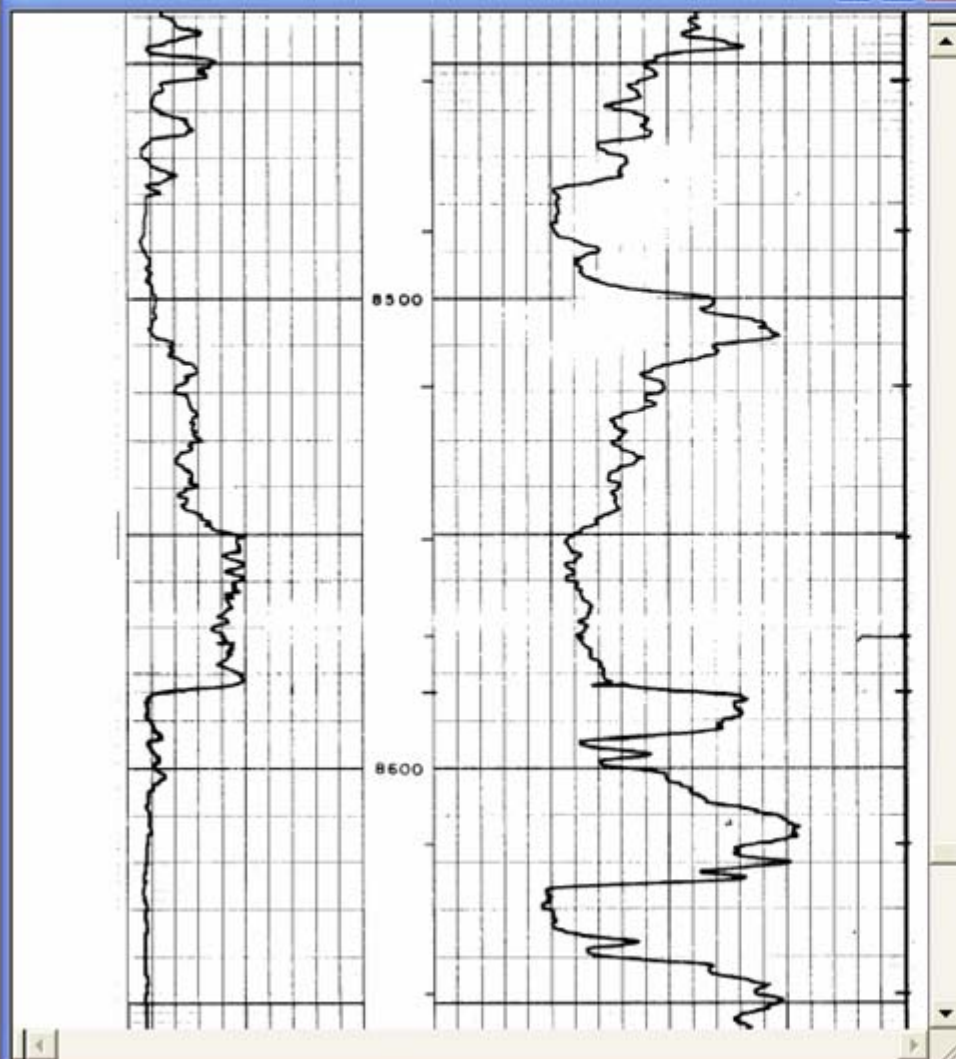
FOLD HERE

Gamma Ray		Equipment Data		Neutron	
Run No.	ONE	Run No.	ONE		
Tool Model No.	2403	Log Type	N-EN		
Diam.	3 1/2"	Tool Model No.	2403		
Detect. Model No.	D6G4	Diam.	3 1/2"		
Type	SCINT.	Detect. Model No.	D6N3		
Length	6"	Type	SCINT.		

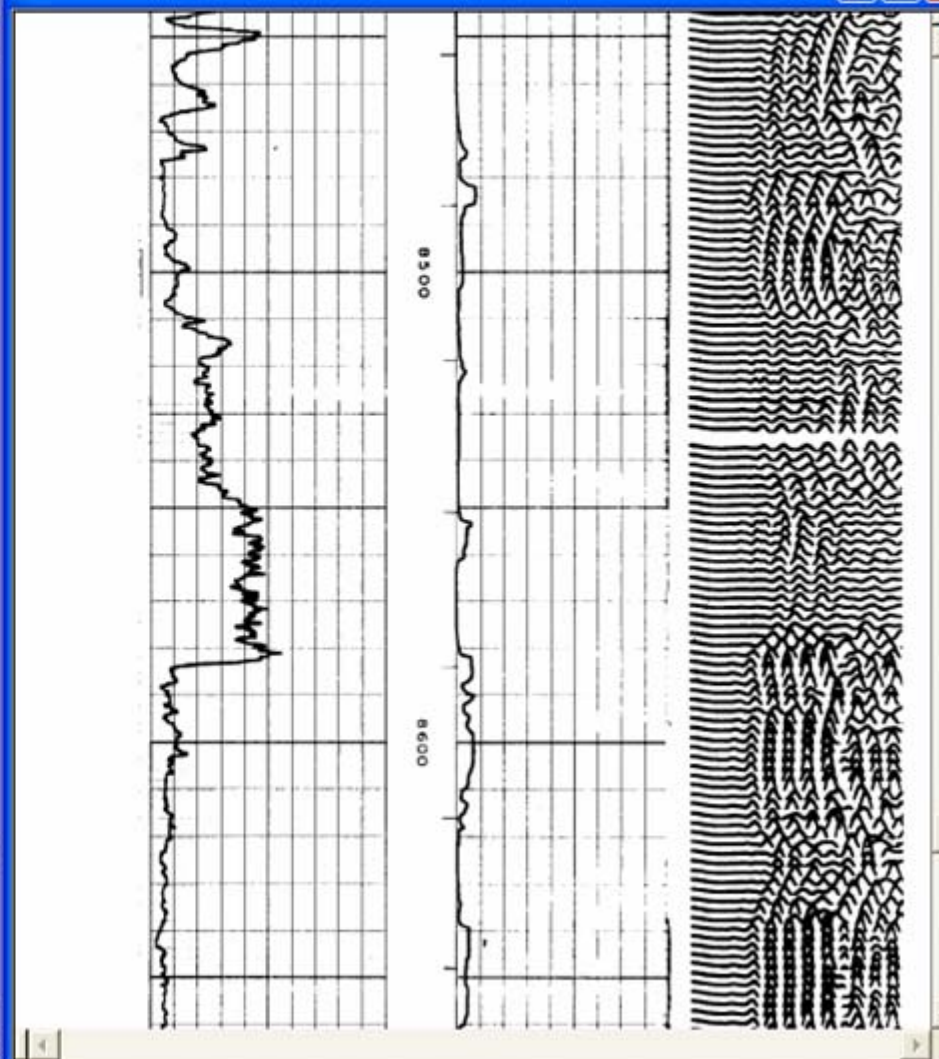


BW Mode

4006320056A



4006320056B



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MACK MCGILLIVRAY (SENIOR GEOLOGIST) email: mack.mcgillivray@state.sd.us

**SOUTH DAKOTA DEPARTMENT OF ENVIRONMENT & NATURAL RESOURCES
MINERALS & MINING PROGRAM - OIL & GAS SECTION**

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